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EXAMINER
GEYER, SCOTT B

ART UNIT	PAPER NUMBER
2829	8

DATE MAILED: 06/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/651,217	COBBLEY ET AL.	
	Examiner	Art Unit	
	Scott Geyer	2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 March 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14,22-64 and 83-92* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14,22-64 and 83-92* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 August 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a)☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
4)☐ Interview Summary (PTO-413) Paper No(s) _____
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other

DETAILED ACTION

1. This action is **NON-FINAL**.

Drawings

2. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

3. The previous notice of acceptable drawings is withdrawn. The drawings are objected to because of minor informalities. In view of above noted paragraph 2, applicant is hereby reminded of the rules for acceptable drawings, including, but not limited to drawing margins, see 37 CFR 1.84(g); character of lines, numbers and letters, see 37 CFR 1.84(i) and copy machine marks 37 CFR 1.84(e).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-6, 8-10, 34-39, 43-53, 55-59, 61, 62 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth et al. (5,286,679) in view of Kato et al. (3,825,580).

As to ***claim 1***, Farnworth et al. teach a wafer (figure 4, numeral 42) having a front and back surface. An adhesive (46) is applied to one surface of the wafer, wherein portions of the wafer are not coated by the adhesive (52).

Farnworth et al. teach an adhesive for attaching a wafer to a leadframe (column 1, lines 30-41), but Farnworth et al. do not specifically teach an instant setting adhesive.

However, Kato et al. do teach an instant setting adhesive for use on materials to be bonded (column 3, lines 1 et seq.).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Farnworth et al. with an instant setting adhesive as taught by Kato et al. A precise alignment is necessary when bonding wafers to leadframes, and it would be advantageous to instantly adhere a wafer to a leadframe given the wafer is properly aligned with the leadframe. The adhesive as taught by Kato et al., used for bonding materials together, would have served just such a purpose of bonding wafers to leadframes. An instant setting adhesive would immediately secure the wafer to the leadframe and retain that positioning during subsequent production steps as the wafer/leadframe is converted to a semiconductor package.

As to ***claim 2***, Farnworth et al. teach singulating lines on the wafer so as to separate the wafer into individual dies after completing the adhesion step (column 5, lines 19 et seq.).

As to ***claim 3***, Farnworth et al. teach singulating lines on the wafer so as to separate the wafer into individual dies after completing the adhesion step (column 5, lines 19 et seq.). The zones where adhesive is not applied to the wafer are streets (figure 4, numeral 52).

As to ***claim 4***, Farnworth et al. teach bond pads left exposed from adhesive (column 5, lines 30 et seq.).

As to ***claim 5***, Farnworth et al. teach applying adhesive using hot or cold screen process, depositing and photo-patterning a photosensitive adhesive or using a resist etch back method (see abstract).

As to ***claim 6***, Kato et al. teach an instant setting adhesive such as a cyanoacrylate or an anaerobic acrylic adhesive (column 1, lines 33-35).

As to ***claim 8***, Kato et al. teach acidic stabilizers, polymerization inhibitors, plasticizers, monomers, viscosity increasing polymers and dyes added to the adhesive to alter the adhesive's characteristics (column 2, lines 55 et seq.).

As to ***claim 9***, Kato et al. teach an instant setting adhesive with a functional R group such as an alkenyl, alkinyl, alkenyloxyalkyl or cycloalkenyl (column 1, lines 56-66).

As to ***claim 10***, Kato et al. teach an instant setting adhesive with a functional R group such as a propargyl group (column 1, lines 67-72, continued to column 2, lines 1 et seq.).

As to ***claim 34***, Farnworth et al teach a die attached to a leadframe using an adhesive. The die is attached to the leadframe using heat and pressure (column 5, lines 38-52). As noted above, Kato et al teach an instant setting adhesive (column 3, lines 1 et seq.). As to the bonding temperature of 200 degrees Celsius or less, Farnworth et al. do not specifically teach the instant temperature range. However, Farnworth et al. do teach heat applied for bonding, and also teach an adhesive application temperature of about 100 to about 500 degrees Celsius (column 6, lines 30 et seq.). Thus, the skilled artisan would find obvious to employ without undue

experimentation the instant temperature ranges, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233. The skilled artisan would find obvious that the required temperature range required for bonding the die to the leadframe would depend upon the specific type of adhesive, with any additives, used for the bonding.

As to ***claim 35***, Farnworth et al. teach a wafer or die with an adhesive coated upon one surface, as noted above. Also as noted above, Kato et al. teach an instant setting adhesive.

As to ***claim 36***, Farnworth et al teach adhesive applied to apportion of the leadframe (column 7, lines 1 et seq.).

As to ***claim 37***, Farnworth et al. teach adhesive applied to a back surface of the die (column 5, lines 14 et seq.).

As to ***claim 38***, Farnworth et al. teach a wafer or die with an adhesive coated upon one surface, as noted above. Also as noted above, Kato et al. teach an instant setting adhesive.

As to ***claim 39***, Farnworth et al. teach bond pads left exposed from adhesive (column 5, lines 30 et seq.).

As to ***claim 42***, Farnworth et al. teach an adhesive applied to one surface of a die, and the die is attached to the leadframe, as noted above. The adhesive layer effectively encapsulates the internal surface of the die of which it covers. Further, Kato et al. teach an instant setting adhesive, as noted above.

As to ***claim 43***, Farnworth et al. teach adhesive applied to a portion of the leadframe (column 7, lines 1 et seq.) such that lead fingers are attached to the wafer (column 5, lines 39 et seq.).

As to ***claim 44***, Farnworth et al. teach a mounting paddle with adhesive applied thereon and attached to a die (column 1, lines 30-41).

As to ***claim 45***, Farnworth et al. teach applying adhesive using hot or cold screen process, depositing and photo-patterning a photosensitive adhesive or using a resist etch back method (see abstract).

As to ***claim 46***, Farnworth et al. teach attaching a die to a leadframe, as noted above wherein an adhesive is applied to dice on a wafer and the wafers are attached to leadframes. The adhesive is applied to portions of the wafer to assist in singulation of the wafer. Also as noted above, Kato et al. teach an instant setting adhesive. Further, as noted above, Kato et al. teach an instant setting adhesive such as a cyanoacrylate or an anaerobic acrylic adhesive.

As to ***claim 47***, Farnworth et al. teach a mounting paddle with adhesive applied thereon and attached to a die (column 1, lines 30-41) and adhesive also applied to back surfaces of the wafer (column 5, lines 14 et seq.).

As to ***claim 48***, Farnworth et al. teach applying the adhesive in a pattern on the wafer such that the pattern has areas of no adhesive which serve as singulation streets, and also leaving bond pads exposed (column 5, lines 19 et seq.).

As to ***claim 49***, Farnworth et al. teach positioning the wafer, with adhesive, to attach to the leadframe under conditions of heat and pressure (column 5, lines 39 et seq.).

As to ***claim 50***, Farnworth et al teach a die attached to a leadframe using an adhesive. The die is attached to the leadframe using heat and pressure (column 5, lines 38-52). As noted above, Kato et al teach an instant setting adhesive (column 3, lines 1 et seq.). As to the bonding temperature of 200 degrees Celsius or less, Farnworth et al. do not specifically teach the instant temperature range. However, Farnworth et al. do teach heat applied for bonding, and also teach an adhesive application temperature of about 100 to about 500 degrees Celsius (column 6, lines 30 et seq.). Thus, the skilled artisan would find obvious to employ without undue experimentation the instant temperature ranges, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233. The skilled artisan would find obvious that the required temperature range required for bonding the die to the leadframe would depend upon the specific type of adhesive, with any additives, used for the bonding.

As to ***claim 51***, Farnworth et al teach adhesive applied to apportion of the leadframe (column 7, lines 1 et seq.) such that lead fingers are attached to the wafer (column 5, lines 39 et seq.). The wafer also has a face surface (figure 4).

As to ***claim 52***, Farnworth et al teach adhesive applied to apportion of the leadframe (column 7, lines 1 et seq.) such that lead fingers are attached to the wafer

(column 5, lines 39 et seq.). Farnworth et al. also teach an adhesive applied to back surfaces of the wafer (column 5, lines 14 et seq.).

As to ***claim 53***, Farnworth et al. teach applying adhesive to the leadframes (column 7, lines 1 et seq.) and a bond is formed as the wafer is attached to the leadframe. Also as noted above, Kato et al. teach an instant setting adhesive. Further, as noted above, Kato et al. teach an instant setting adhesive such as a cyanoacrylate or an anaerobic acrylic adhesive.

As to ***claim 55***, Farnworth et al. teach a mounting paddle (column 1, lines 30-41).

As to ***claim 56***, Farnworth et al. teach a lead-on-chip frame (column 1, lines 55 et seq.).

As to ***claim 57***, Farnworth et al. teach a leadframe with a die paddle, as noted above. Farnworth et al. teach an adhesive on the leadframe, as noted above. Farnworth et al. teach bonding a die with the leadframe using the adhesive, as noted above. Farnworth also teach applying temperature and pressure to make the bond, as noted above. As to the temperature range of 200 degrees Celsius or less, see above. Further, as also noted above, Kato et al. teach an instant setting adhesive.

As to ***claim 58***, Kato et al. teach an instant setting adhesive with a functional R group such as an alkenyl, alkinyl, alkenyloxyalkyl or cycloalkenyl (column 1, lines 56-66).

As to ***claim 59***, Farnworth et al. teach applying adhesive using hot or cold screen process, depositing and photo-patterning a photosensitive adhesive or using a resist etch back method (see abstract).

As to ***claim 61***, Kato et al. teach acidic stabilizers, polymerization inhibitors, plasticizers, monomers, viscosity increasing polymers and dyes added to the adhesive to alter the adhesive's characteristics (column 2, lines 55 et seq.).

As to ***claim 62***, Farnworth et al. teach a leadframe and an adhesive on the leadframe, as noted above. The leadframe has a plurality of lead fingers (column 4, lines 18 et seq.). Farnworth et al. teach bonding a die with the leadframe using the adhesive, as noted above. Kato et al. teach an instant setting adhesive such as cyanoacrylate or an anaerobic acrylic adhesive (column 1, lines 33-35).

As to ***claim 64***, Kato et al. teach an instant setting adhesive with a functional R group such as an alkenyl, alkinyl, alkenyloxyalkyl or cycloalkenyl (column 1, lines 56-66).

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6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth et al.(5,286,679) and Kato et al. (3,825,580) as applied to claim 1 above, and further in view of Mones et al. (4,172,907).

Neither Farnworth et al. nor Kato et al. teach an adhesion promoter applied to the surface of a wafer prior to applying the adhesive.

However, Mones et al. do disclose applying a thin first coating of adhesion promoter to a surface of a circuit element before the adhesion is applied (column 4, lines 29 et seq.).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Farnworth et al. and Kato et al. with an adhesive

promoter as taught by Mones et al. An adhesion promoter would ensure the bond between the adhesive and the wafer, such that after applying the wafer to the leadframe, the wafer would not be allowed to deviate from its aligned position. The instant setting adhesive of Kato et al. would ensure a bond between adhesive and the leadframe, and the adhesion promoter would ensure the bond between the adhesive and the wafer.

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7. Claims 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth et al. (5,286,679) and Kato et al. (3,825,580) as applied to claim 34 above, and further in view of Bujard (5,399,416).

As to ***claim 40***, neither Farnworth et al. nor Kato et al. teach a conductive filler within the adhesive composition used to form a heat sink, and attaching the heat sink to the leadframe.

However, Bujard teaches a heat conductive filler used in an adhesive. The adhesive with conductive filler is adjacent at least one substrate. The heat conductive filler conducts heat, and thus acts as a 'heat sink' (column 1, line 5 et seq.).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Farnworth et al. and Kato et al. with a conductive filler disposed within the adhesive as taught by Bujard. As the adhesive of Farnworth et al. is in intimate contact with the die and leadframe, a conductive filler as taught by Bujard would aide in dissipating heat from the die and leadframe during usage of the finished device.

As to ***claim 41***, Farnworth et al. teach adhesive used to attach a die to a leadframe, as noted above. Bujard teaches a heat conductive filler disposed in adhesive, as noted above. As such, the heat conductive filler acts as a heat sink, and would be attached to the package.

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8. Claims 54 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth et al. (5,286,679) and Kato et al. (3,825,580) as applied to claims 53 and 62 respectively above, and further in view of Eichelberger (5,841,193).

As to ***claim 54***, neither Farnworth et al. or Kato et al. teach applying a catalyst to one surface of the lead fingers before the die placing step.

However, Eichelberger discloses applying a catalyst to one surface while the cyanoacrylate adhesive is applied to the other surface (column 10, lines 34-38).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art at to modify the method of Farnworth et al and Kato et al. with a catalyst as taught by Eichelberger. The adhesive can be applied and prepared to one surface while a catalyst is applied to a second surface. The catalyst ensures an instantaneous bond between the two surfaces when brought into contact. Given proper alignment of the wafer with the leadframe, at the instant they are contacted, the two would be permanently bound to each other, and remain in their proper alignment through further manufacturing steps.

As to ***claim 63***, Eichelberger discloses applying a catalyst to one surface while the cyanoacrylate adhesive is applied to the other surface (column 10, lines 34-38).

9. Claim 60 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth et al. (5,286,679) and Kato et al. (3,825,580) as applied to claim 57 above, and further in view of Farnworth et al. (5,893,726).

Neither Farnworth et al. ('679) or Kato et al. teach applying adhesive in the form of a pattern of dots.

However, Farnworth et al. ('726) teach a pattern of dots used to secure a cover to a ridge plate (column 6, lines 31 et seq.).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art at to modify the method of Farnworth et al. ('679) and Kato et al. with an adhesive application in a pattern consisting of dots as taught by Farnworth et al. ('726). By using a pattern of dots of adhesive, as opposed to a complete layer of adhesive, the wafer can be permanently bonded to the leadframe for testing purposes, but would also allow for easier removal in cases where the wafer was defective or not aligned properly. Further, a pattern of dots of adhesive would use less material than a complete layer of adhesive, thereby providing more efficient use of materials.

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10. Claims 11-14, 22-27 and 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth et al. (5,286,679) in view of Kato et al. (3,825,580) and Kameyama et al. (4,720,513).

As to ***claim 11***, Farnworth et al. teach a wafer (figure 4, numeral 42) having a front and back surface. An adhesive (46) is applied to one surface of the wafer, wherein portions of the wafer are not coated by the adhesive (52).

Farnworth et al. teach an adhesive for attaching a wafer to a leadframe (column 1, lines 30-41), but Farnworth et al. do not specifically teach an instant setting adhesive. Also, Farnworth et al. do not teach a thixotropic index of about 4 to about 6 for the adhesive.

However, Kato et al. do teach an instant setting adhesive for use on materials to be bonded (column 3, lines 1 et seq.).

Further, Kameyama et al. teach a thixotropic index for an instant setting adhesive in the range of 3 and greater (column 2, lines 56 et seq., continuing to column 3, lines 1-6).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Farnworth et al. with an instant setting adhesive as taught by Kato et al. A precise alignment is necessary when bonding wafers to leadframes, and it would be advantageous to instantly adhere a wafer to a leadframe given the wafer is properly aligned with the leadframe. The adhesive as taught by Kato et al., used for bonding materials together, would have served just such a purpose of bonding wafers to leadframes. An instant setting adhesive would immediately secure the wafer to the leadframe and retain that positioning during subsequent production steps as the wafer/leadframe is converted to a semiconductor package. Further, it would have been obvious to a person of ordinary skill in the art to modify the method of

Farnworth et al. with an adhesive possessing a thixotropic index of about 4 to about 6 as taught by Kameyama et al. such that the die and leadframe form a strong bond when the two materials are bonded together.

As to ***claim 12***, Farnworth et al. teach applying adhesive using hot or cold screen process, depositing and photo-patterning a photosensitive adhesive or using a resist etch back method (see abstract).

As to ***claim 13***, Kato et al. teach an instant setting adhesive such as a cyanoacrylate or an anaerobic acrylic adhesive (column 1, lines 33-35).

As to ***claim 14***, Farnworth et al. teach singulating lines on the wafer so as to separate the wafer into individual dies after completing the adhesion step (column 5, lines 19 et seq.). The zones where adhesive is not applied to the wafer are streets (figure 4, numeral 52). Farnworth et al. also teach bond pads left exposed from adhesive (column 5, line 30 et seq.), wherein the adhesive is applied o a surface of the wafer.

As to ***claim 22***, and as noted above, Farnworth et al. teach a wafer (figure 4, numeral 42) having a front and back surface. An adhesive (46) is applied to one surface of the wafer, wherein portions of the wafer are not coated by the adhesive (52). Farnworth et al. teach an adhesive for attaching a wafer (or die) to a leadframe (column 1, lines 30-41). Further, Kato et al. teach an instant setting adhesive for use on materials to be bonded (column 3, line 1 et seq.) and Kato et al. teach an instant setting adhesive such as a cyanoacrylate or an anaerobic acrylic adhesive (column 1, lines 33-35). Also as noted above, Kameyama et al. teach a thixotropic index for an instant

setting adhesive in the range of 3 and greater (column 2, line 56 et seq., continuing to column 3, lines 1-6).

As to ***claim 23***, Farnworth et al. teach applying adhesive to the die, as noted above. Also as noted above, Kato et al. teach an instant setting adhesive.

As to ***claim 24***, Farnworth et al. teach adhesive applied to a portion of the leadframe (column 7, line 1 et seq.).

As to ***claim 25***, Farnworth et al. teach adhesive applied to aback surface of the die (column 5, line 14 et seq.).

As to ***claim 26***, Farnworth et al. teach adhesive applied to a face surface of the die (column 5, line 5 et seq.).

As to ***claim 27***, Farnworth et al. teach bond pads left exposed from adhesive (column 5, lines 30 et seq.).

As to ***claim 30***, Farnworth et al. teach an adhesive applied to one surface of a die, and the die is attached to the leadframe, as noted above. The adhesive layer effectively encapsulates the internal surface of the die of which it covers. Further, Kato et al. teach an instant setting adhesive, as noted above.

As to ***claim 31***, Farnworth et al. teach adhesive applied to a portion of the leadframe (column 7, lines 1 et seq.) such that lead fingers are attached to the wafer (column 5, lines 39 et seq.).

As to ***claim 32***, Farnworth et al. teach a mounting paddle with adhesive applied thereon and attached to a die (column 1, lines 30-41).

As to ***claim 33***, Farnworth et al. teach applying adhesive using hot or cold screen process, depositing and photo-patterning a photosensitive adhesive or using a resist etch back method (see abstract).

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11. Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth et al. (5,286,679) and Kato et al. (3,825,580) as applied to claim 22 above, and further in view of Bujard (5,399,416).

As to ***claim 28***, neither Farnworth et al. nor Kato et al. teach a conductive filler within the adhesive composition used to form a heat sink, and attaching the heat sink to the leadframe.

However, Bujard teaches a heat conductive filler used in an adhesive. The adhesive with conductive filler is adjacent at least one substrate. The heat conductive filler conducts heat, and thus acts as a 'heat sink' (column 1, line 5 et seq.).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Farnworth et al. and Kato et al. with a conductive filler disposed within the adhesive as taught by Bujard. As the adhesive of Farnworth et al. is in intimate contact with the die and leadframe, a conductive filler as taught by Bujard would aide in dissipating heat from the die and leadframe during usage of the finished device.

As to ***claim 29***, Farnworth et al. teach adhesive used to attach a die to a leadframe, as noted above. Bujard teaches a heat conductive filler disposed in

adhesive, as noted above. As such, the heat conductive filler acts as a heat sink, and would be attached to the package.

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12. Claims 90-92 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth et al. (5,286,679) and Kato et al. (3,825,580) as applied to claim 11 above, and further in view of Kimura et al. (4,321,180).

As to ***claim 90***, neither Farnworth et al. nor Kato et al. teach instant setting adhesive setting times in the range of about 0.1 seconds to 120 seconds or setting temperatures.

However, Kimura et al. teach setting times of 10 seconds and 30 seconds for a cyanoacrylate adhesive applied to a surface (column 10, lines 57 et seq.).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Farnworth et al. and Kato et al. with an adhesive setting time of under 2 minutes as taught by Kimura et al. The shorter the setting time is for ensuring the bond between the die and the leadframe, the more efficient the overall manufacturing process would be for making semiconductor packages.

As to ***claim 91***, Kimura et al. teach setting times of 10 seconds and 30 seconds for a cyanoacrylate adhesive applied to a surface (column 10, lines 57 et seq.).

As to ***claim 92***, Kimura et al. teach setting times of 10 seconds and 30 seconds for a cyanoacrylate adhesive applied to a surface (column 10, lines 57 et seq.).

Kimura et al. do not specifically teach the instant setting temperature of about 20 degrees Celsius to about 30 degrees Celsius. However, Kimura et al. do teach

cyanoacrylate adhesives setting almost instantaneously at room temperature (column 1, line 8 et seq.). Thus, the skilled artisan would find obvious to employ without undue experimentation the instant temperature ranges, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233. The skilled artisan would find obvious that the required temperature range required for bonding the die to the leadframe would depend upon the specific type of adhesive, with any additives, used for the bonding.

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13. Claims 83-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth et al. (5,286,679) in view of Kato et al. (3,825,580) and Kimura et al. (4,321,180).

As to ***claim 83***, Farnworth et al. teach a wafer (figure 4, numeral 42) having a front and back surface. An adhesive (46) is applied to one surface of the wafer, wherein portions of the wafer are not coated by the adhesive (52).

Farnworth et al. do not teach an instant setting adhesive or an adhesive setting time of between about 0.1 seconds to about 120 seconds.

However, Kato et al. do teach an instant setting adhesive for use on materials to be bonded (column 3, lines 1 et seq.).

Further, Kimura et al. teach setting times of 10 seconds and 30 seconds for a cyanoacrylate adhesive applied to a surface (column 10, lines 57 et seq.).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Farnworth et al. with an instant setting adhesive as taught by Kato et al., and wherein the setting time of the adhesive is under 2 minutes as taught by Kimura et al. An instant setting adhesive ensures a permanent bond between the two surfaces while not allowing the two surfaces (wafer and leadframe) to move out of alignment. Also, the shorter the setting time is for ensuring the bond between the die and the leadframe, the more efficient the overall manufacturing process would be for making semiconductor packages.

As to ***claim 84***, Kimura et al. teach setting times of 10 seconds and 30 seconds for a cyanoacrylate adhesive applied to a surface (column 10, lines 57 et seq.).

As to ***claim 85***, Kimura et al. teach setting times of 10 seconds and 30 seconds for a cyanoacrylate adhesive applied to a surface (column 10, lines 57 et seq.).

Kimura et al. do not specifically teach the instant setting temperature of about 20 degrees Celsius to about 30 degrees Celsius. However, Kimura et al. do teach cyanoacrylate adhesives setting almost instantaneously at room temperature (column 1, line 8 et seq.). Thus, the skilled artisan would find obvious to employ without undue experimentation the instant temperature ranges, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233. The skilled artisan would find obvious that the required temperature range required for bonding the die to the leadframe would depend upon the specific type of adhesive, with any additives, used for the bonding.

As to ***claim 86***, Farnworth et al. teach adhesive applied to one surface of the wafer, wherein portions of the wafer are not coated by the adhesive (52). Farnworth et al. also teach singulating lines on the wafer so as to separate the wafer into individual dies after completing the adhesion step (column 5, lines 19 et seq.). The zones where adhesive is not applied to the wafer are streets (figure 4, numeral 52).

As to ***claim 87***, Farnworth et al. teach bond pads left exposed from areas where adhesive is not applied (column 5, lines 30 et seq.).

As to ***claim 88***, Farnworth et al. teach applying adhesive using hot or cold screen process, depositing and photo-patterning a photosensitive adhesive or using a resist etch back method (see abstract).

As to ***claim 89***, Kato et al. teach an instant setting adhesive such as a cyanoacrylate or an anaerobic acrylic adhesive (column 1, lines 33-35).

Response to Arguments

14. Applicant's arguments with respect to claims 1-14, 22-64 and 83-92 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott Geyer whose telephone number is (703) 306-5866. The examiner can normally be reached on weekdays, between 10:00am - 6:30pm. The examiner may also be reached via e-mail: **scott.geyer@uspto.gov**

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on (703) 308-1680. The fax phone numbers

for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

sbg
May 30, 2002

6/3/02

MICHAEL SHERRY
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